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(54) PROCEDURE FOR INPUT OF INFORMATION FOR PROCESS CONTROL AND/OR
ADJUSTMENT BY MEANS OF AN INPUT DISPLAY UNIT IN COORDINATION WITH A
PEN

For the input of set values into a set-value memory
for process control and/or adjustment by means
of a display unit in coordination with a pen.
Coordination points can be entered with a
Pen; after entering merely the corner dots of a
desired graph into a coordinate system displayed by
the input display unit, consisting of coordinates
between these corner dots, the coordinates of the
set-value graph located between the dots are
determined by a microprocessor and stored as set
values in the set-value memory. The input display
unit then displays a coordinate system determined
on the basis of prior input information, to be imaged,
based on their physical dimensions and their units

[DIAGRAM]

Patent Claims

1. Procedure for the input of information for process control and/or adjustment by means of an input display unit in coordination with an input pen. Coordinate points can be entered into the display unit with the input pen. This procedure is characterized by the fact that for the input of set values into a set-value memory for process control and/or adjustment, upon entering merely the corner dots (E) of a desired set value graph (K) into a coordinate system created from these coordinates between these corner dots (E), a microprocessor (R) determines the coordinates of the interdots (Z) located between the corner dots (E) of the desired set value graph (K), which then, together with the coordinates of the corner points entered with a light pen (G), are stored in the set-value memory (S).
2. Procedure claimed in claim 1, characterized by the fact that the input display unit (B) displays a coordinate system determined by prior information based on the physical dimensions and their units to be imaged.

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Procedure for Input of Information for Process Control and/or Adjustment by
Means of an Input Display Unit Coordinated with an Input pen

Set-point adjusters are frequently used for the control and/or adjustment of technical processes. With their help a time-dependent command variable for process control and adjustment is set so that the control and/or adjustment function variable always indicates its set value, i.e., the value it must have at any point in time. Function variables and command variables may involve different physical variables, e.g., temperature (and/or march of temperature) as a function variable and an electrical signal imaging the march of temperature as a command variable. Such an electrical signal can be created by means of a set-point adjuster to store the path of the signal by optical or electrical means.

To achieve the desired course of the function variable, first a relevant signal path must be entered into the set-point adjuster. This can be achieved by an operator who keys the coordinate data of individual dots of the set-value graph in dot-by dot

In a different context, (cf. NTZ-Report15 [Journal of Communication Engineering], "Data Display Units", 1973, especially pp. 7, 9, 13, 44) there is a known procedure of entering graphs of function-curves into a graph memory by entering data of different graph dots into the input display unit in coordination with an input pen, e.g., a light pen, by entering coordinate dots with the input pen or by entering them dot-by-dot via a microprocessor. There are no connections provided to process elements, in particular for set-value output.

This method of entering a set-value path into a set-point adjuster dot-by-dot for process control and/or adjustment appears to be relatively time-consuming and particularly disturbing if set-value graphs have to be altered more or less frequently, as is the case in experimental runs.

However, (from DE-PS 25 10 632) the method of entering information via input display unit and pen, by entering coordinate dots by pen is currently known. Commands are entered by a light pen to the process by positioning the command on the corresponding symbolic process element .

This method of one display presupposing all commands possible for the process element concerned appears feasible for the input of relatively few commands, entered on an infrequent basis; otherwise the display of the commands as well as time consumed could turn problematic for the input of commands.

This invention points out a method for a less time-consuming input of set values into a set-value memory for process control and/or adjustment by means of an input display unit, together with an input pen, by entering into it coordinate points with the input pen. This invention involves a procedure for the input of set values into a memory for process control and adjustment by means of an input display unit, together with an input pen, by entering coordinate dots; according to the invention, this procedure is characterized by the fact that for the input of set values into a set value memory for process control and/or adjustment, following input of only the corner dots of a desired set value graph into a coordinate system displayed by the input display unit, the coordinates of the interdots located between the corner dots of the desired set value graph are determined by a microprocessor and subsequently stored as set values in a set-value memory, together with the coordinates of the corner dots entered by the light pen.

The invention which abandons the more extensive set-value input by a light pen, has the advantage of avoiding the time-consuming attempt to achieve utmost accuracy of the set-value graph while still being able to succeed in storing a computer-exact corner dot to corner dot set-value graph.

In further developing the invention, the input display unit can display a certain coordinate system based on previous input information pursuant to physical variables and their units to be imaged, having the advantage of entering set values of vastly different variables and dimensions into the connected set-point adjuster by means of one and the same display unit.

The diagram describes the invention in more detail.

The diagram represents a schematic view in a scope required for understanding the invention of an arrangement for input of set values into a set-value memory S, having an input display unit B coordinated with an input pen G. Although this is not shown in detail in the diagram, the input display unit B next to the actual display screen with associated deflecting control and brightness control can have central control and data memory which allows to input functional graphs with a light pen/input pen G dot-by-dot. The input display unit B is connected to a microprocessor R able to read the functional dots entered into the input display unit B from any location of the display screen and, conversely, can enter function dots in any location of the display screen. Microprocessor R is also connected to set-value memory S. In addition, the diagram shows that the display screen can be provided with virtual keys (located on the right-hand side in the diagram) ("24 H", "48 h", "72 h"; "° C"), which can be "activated" by a light pen G as a so-called key-simulation.

For the input of process control and/or adjustment set values, e.g. temperature set values for climatic test cabinets, where set-value memory S functions, a schematic arrangement is depicted in the following diagram

An operator may have already entered information over a desired time period of 24 hours by a light pen G as a keyboard simulation, during which period set values are supposed to appear, so that horizontal scaling has been set on the display screen for set-value input; furthermore, again by way of keyboard simulation, information may have been entered about the set values to be determined for the physical variable, for example, the temperature in ° C, so that for set value input vertical scaling has been set on the display screen. Thereby, based on prior input information, the input display unit displays the coordinate system determined by the physical variables and their units to be imaged from the set-value graph, where according to displayed coordination variables, certain functional values, for example, temperature and time-determined process control

and/or adjustment set values can be displayed. By means of the light pen G, these functional values can be entered dot-by-dot.

For the input of set values into the set-value memory S for process and/or adjustment control, only the corner dots E of a desired set value graph K have to be entered by a light pen --schematically depicted in the diagram -- into the coordinate system as displayed by display unit B. The coordinates of these corner dots E are now received by the microprocessor R, which determines the interdots Z located between corner dots E, as shown in the diagram. Finally, the coordinates of these interdots Z, together with the coordinates of the entered corner dots E, entered by the light pen G, are stored as set values in set-value memory S.

From the beginning of the process to be controlled and/or adjusted, the set values can be released in proper sequence at the output point s of the set-value memory S, regardless of whether they were entered by a light pen G or whether they were determined by microprocessor R. This will not be discussed any further at this point.

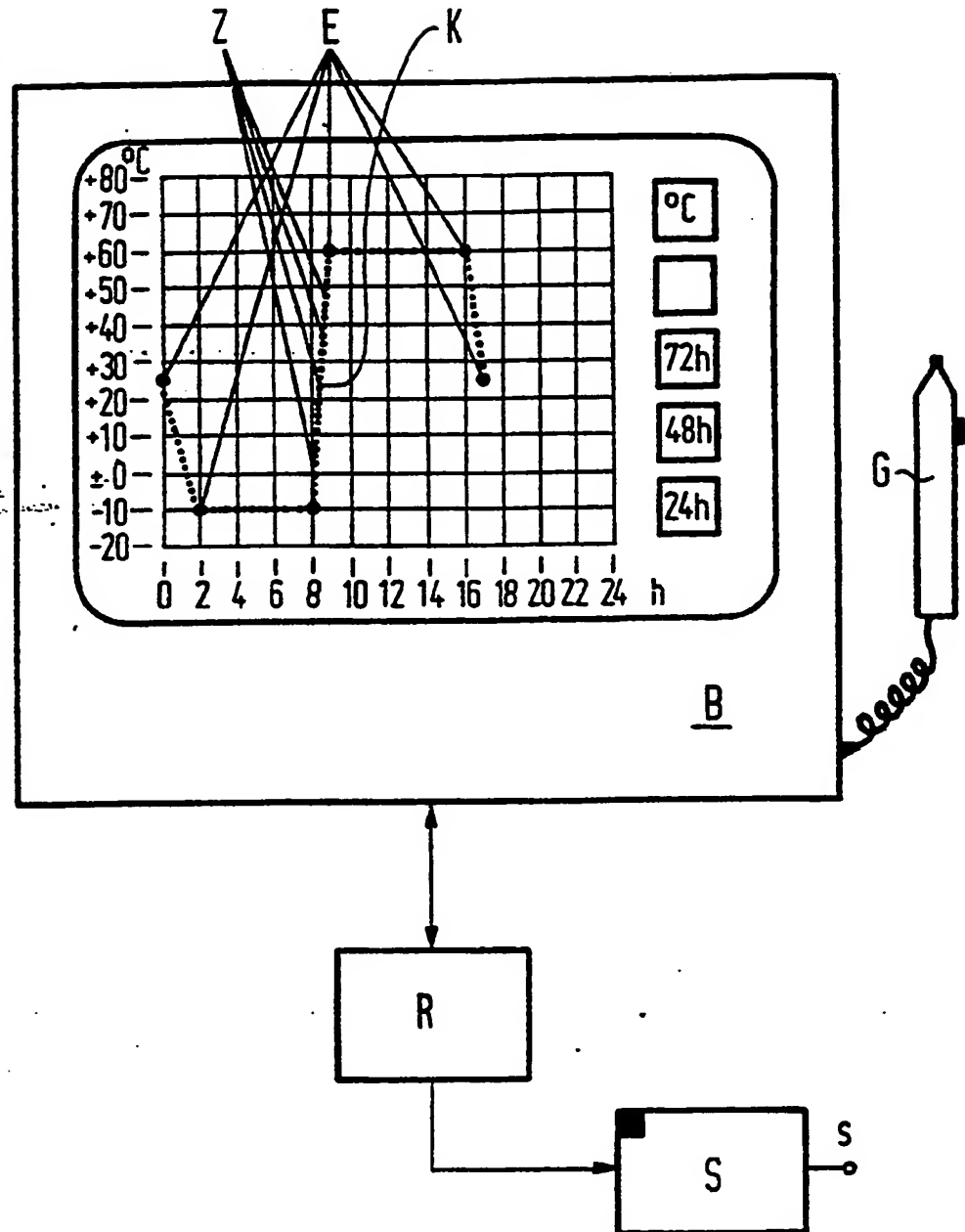
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